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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/701,705	12/01/2000	Yukihiko Okumura	15689.61	7195

7590 02/10/2006	EXAMINER

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ART UNIT	PAPER NUMBER
2637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)
Office Action Summary		09/701,705	OKUMURA ET AL.
		Examiner	Art Unit
		Qutub Ghulamali	2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2005*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-8,18,20,22,23,33-37,47,49,51 and 53-84* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5,19,54-61 and 70-77* is/are allowed.

6)☒ Claim(s) *1,2,4,6-8,18,20,22,23,33-37,47,49,51,53,62-69 and 78-84* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date *11/7/05,9/21/05*.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This Office Action is in response to Remarks/Amendments filed by the applicant on

11/18/2005.

2.   The amendment to the Abstract of the Disclosure is acknowledged and is considered

acceptable.

Response to Arguments

3.   Applicant's amendment filed 11/18/2005, have been fully considered and as a result

claims 5, 19, 55-61 are now indicated allowable.

Reasons for Allowance

4.   Applicant's amendment, see pages 32-33, filed 11/18/2005, with respect to the rejection

of claims 5, 19, 55-61 have been fully considered and are persuasive. The rejection of claims 5,

19, 55-61 has been withdrawn. Claims 5, 19, 54-61 and 70-77 are allowed. However,

applicant's amendment of claims 1, 2, 4, 6-8, 18, 20, 22, 23, 33-37, 47, 49, 51, 53, 62-69 and 78-

84 does not place the application in condition for allowance. The rejection of these claims is

maintained. The rejection follows:

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 1, 2, 4, 6-8, 18, 20, 22, 23, 33-37, 47, 49, 51, 53, 62-69, 78-84 are rejected under

35 U.S.C. 103(a) as being unpatentable over Abeta et al (USP 6,647,003) in view of Huang et al

(USP 5,881,056).

Regarding claims 1, 18, 23, 33, 37, 47, 49, 51, 64, 65, 67, 68, and 83, Abeta, discloses a

channel estimation and demodulation device comprising:

weighting factor generating means for generating weighting factors for weighting and averaging

pilot symbols which are time multiplexed with a control channel, which is parallel multiplexed

with a data channel (abstract; col. 2, lines 54-65; col. 8, lines 24-28; col. 9, lines 19-24), and

channel estimation value calculating means for weighting and averaging said pilot symbols using

said weighting factors and calculating a channel estimation value of data symbols of said data

channel (figs. 2, 5, elements S201-S205, S501-S506; col. 4, lines 8-42) wherein weighting

factors are determined according to the positions of said pilot symbols in the slots of said control

channel (col. 7, lines 63-67; col. 8, lines 1-15).

Regarding claim 8, Abeta discloses demodulation means comprising:

weighting factor generating means for generating weighting factors to be used for weighting and

averaging pilot symbols being time multiplexed in a control channel that was parallel

multiplexed together with a data channel (col. 2, lines 54-59);

channel estimation value calculating means for weighting and averaging said pilot symbols using

said weighting factors and for calculating a channel estimation value of data symbols of said data

channel (figs. 2, 5, elements S201-S205, S501-S506; col. 4, lines 8-42); and

channel variation (fluctuations) compensating means for compensating channel variation of said

data symbols using the channel estimation value calculated by said channel estimation value

calculating means (col. 3, lines 10-15),

wherein weighting factors are determined according to the positions of said pilot symbols in the

slots of said control channel (col. 7, lines 63-67; col. 8, lines 1-15).

Abeta further discloses channel variation compensating means for compensating channel

variation of said data symbols using the channel estimation value calculated by said channel

estimation value calculating means (col. 2, lines 3-8, 39-48). Abeta, though discloses

multiplexing of data and control channel (pilot), however, does not clearly express the limitation

"pilot symbols time multiplexed with a data channel".

Huang in a similar field of endeavor discloses this operation via the complex processor

implementation of pilot symbols time multiplexed with a data channel (col. 9, lines 3-16, 56-62).

It would have been obvious to a person of ordinary skill in the art at the time the invention was

made to use a time multiplexing scheme as taught by Huang in the channel estimation apparatus

of Abeta because it can track and acquire timing information for channel sub code and further to

control the reception of and dispreading of all the remaining sub codes.

Regarding claims 2, 20, 34, Abeta discloses said weighting factor generating means

generates weighting factors to be used for weighting and averaging mean values of the pilot

symbols in a plurality of slots of said control channel and said channel estimation value

calculating means weights and average the mean values of said pilot symbols using said

weighting factors and calculates the channel estimation value of the data symbols of said data

channel (col. 2, lines 53-65).

Regarding claims 4, 66, Abeta discloses said weighting factor generating means divides

the data symbols in the slots of said data channel into a plurality of data symbol sections, selects

the pilot symbols appropriate for calculating the channel estimation value of the data symbols in

each of the data symbol sections and generates the weighting factors to be used for weighting

and averaging the pilot symbols (col. 2, lines 53-65); and

said channel estimation value calculating means takes weighted average of said pilot symbols

using said weighting factors and calculates the channel estimation value of the data symbols of

each of the data symbol sections (abstract; col. 2, lines 39-46, 54-58).

Regarding claims 6 and 35, Abeta discloses fading frequency decision means for

deciding the fading frequency based on an inner product value of said pilot symbols (col. 1, lines

66-67; col. 2, lines 1-8, 39-48); and

factor altering means for altering the factors that are used in taking said weighted average

according to the fading frequency decided by said fading frequency decision means (col. 7, lines

50-67; col. 8, lines 1-18).

Regarding claims 7, 36, Abeta discloses a transmission rate of said data channel differs

from the transmission rate of said control channel (col. 1, lines 55-61).

Regarding claim 22, Abeta discloses channel estimation further comprising fading

frequency decision means (processor receiving spread data symbol sequence) for deciding the

fading frequency based on the inner product value of pilot symbols (col. 3, lines 55-61; col. 4. lines 9-25); and

factor altering means for altering the factors to be used for taking said weighted averaging according to the fading frequency decided by said fading frequency decision means (col. 3, lines 59-63).

Regarding claim 53, Abeta discloses a demodulating device comprising:

channel estimating means for deriving N (N is natural number greater than or equal to two) in number of channel estimation values by weighted averaging of pilot signals in time using N in number of weighted sequences (col. 14, lines 10-18);

compensating means for compensating data sequences using said respective channel estimation values (col. 2, lines 3-8, 39-48);

RAKE combining means for RAKE combining respective of said N data sequences after compensation (col. 8, lines 29-43); and

reliability judgment (highly accurate, accuracy) means for selecting one data sequence having highest reliability from said N data sequences after RAKE combination (col. 9, lines 5-13).

Regarding claims 62, 63, Abeta discloses a demodulating device comprising:

channel estimating means for weighted averaging of reception pilot signals using a plurality of weighting sequences and deriving a plurality of channel estimation values (col. 14, lines 10-18);

demodulating means for inputting data sequences and outputting a plurality of demodulated data sequences using said plurality of channel estimation values (col. 2, lines 59-67; col. 3; lines 1-15; and

reliability judging means (highly accurate, accuracy) for selecting one demodulated data by making judgment of reliability (accuracy) of said plurality of demodulated data sequences (col. 9, lines 5-13).

Regarding claims 69, the steps claimed as method is nothing more than restating the function of the specific components of the apparatus as claimed above and therefore, it would have been obvious, considering the aforementioned rejection for the apparatus claim 53.

Regarding claims 78, the steps claimed as method is nothing more than restating the function of the specific components of the apparatus as claimed above and therefore, it would have been obvious, considering the aforementioned rejection for the apparatus claim 62.

Regarding claims 79, Abeta discloses based on the judgment (determination) said plurality of demodulated data sequences, a predetermined number of weight sequences are selected from among said plurality of weight sequences. and after the selection. demodulation through the use of only the selected weight sequences is performed (col. 2, lines 28-33, lines 39-48, lines 50-65).

Regarding claim 80, Abeta discloses said pilot signals are time multiplexed into a control channel that is parallel multiplexed together with the data channel in which said data sequence is contained (abstract; col. 2, lines 54-65; col. 8, lines 24-28; col. 9, lines 19-24).

Regarding claim 81, Abeta discloses all of the claim limitation above except said pilot signals are time multiplexed into one channel together with the data sequence. Huang in a similar field of endeavor discloses pilot signals are time multiplexed into one channel together with the data sequence (abstract; col. 9, lines 59-63; col. 10, lines 4-24). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a time

multiplexing scheme as taught by Huang in the channel estimation apparatus of Abeta because it

can track and acquire timing information for channel sub code and further to control the

reception of and dispreading of all the remaining sub codes.

Regarding claims 82 and 84, Abeta discloses demodulation method wherein estimating a

channel divides the data symbols in the slots of said data channel into a plurality of data symbol

sections, selects the pilot symbols appropriate for calculating the channel estimation value of the

data of each of the data sequence sections and calculates a channel estimation value of the data

of each data sequence sections by weighting and averaging the selected pilot signals (col. 2. lines

53-65; col. 7, lines 20-67).

Allowable Subject Matter

7.   Claims 5, 19, 54-61 and 70-77 allowed.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

US Patents:

Ramesh (USP 6,519,300) discloses a system and method for automatic frequency correction in a

pilot symbol assisted demodulator.

Narvinger et al (USP 6,381,229) shows a random access in a mobile telecommunications system

structure with separate preamble and data portions.

Publications:

Hidehiro Andoh, et al, "Channel Estimation Filter Using Time-Multiplexed Pilot Channel For Coherent RAKE Combining in DS-CDMA Mobile Radio, IEICE Trans. Communication. Vol. E81-B, No. 7, pp. 1517-1526, July 1998.
Sadayuki Abeta, et al, Performance Comparison between Time-Multiplexed Pilot Channel and Parallel Pilot Channel for Coherent Rake Combining in DS-CDMA Mobile Radio". IEICE Transaction Communication, Vol. E81-B, No. 7, pp. 1417-1425, July 1998.

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-3014. The examiner can normally be reached on Monday-Friday from 7:00AM - 4:30PM 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QG.
February 2, 2006.

JEAN B. CORRIELUS
PRIMARY EXAMINER   2-3-06